

Claims

- [c1] A bridge fitting for use in a fluid manifold system for being in fluid communication with one or more fluid components, such as valves, regulators, pressure transducers, mass flow controllers, and the like, the bridge fitting comprising:
- a first fitting connected to a second fitting, with said connected fittings having an internal fluid passageway therethrough; said internal passageway of said bridge fitting having an inlet end and an outlet end, with said inlet end in fluid communication with an outlet port of the first fluid component, and said outlet end of said bridge fitting in fluid communication with an inlet port of a second fluid component.
- [c2] The bridge fitting of claim 1 further comprising a plurality of metallic seals interposed between and sealing the internal passageway of the bridge fitting with the port of the fluid component.
- [c3] The bridge fitting of claim 1 wherein the bridge fitting has a U shaped fluid passageway.
- [c4] A bridge fitting for use in a fluid manifold system for be-

ing in fluid communication with three or more fluid components, wherein one or more of said fluid components has a single port, the bridge fitting comprising: a first and second elbow fitting having a respective end connected to a tee fitting; said tee fitting being located between said elbow fittings; each of said elbow fittings and said tee fittings having an internal fluid passageway in fluid communication with each other; said internal passageway of said fittings having an inlet end and a first and second outlet end, with said inlet end in fluid communication with an outlet port of the first fluid component, and said outlet ends of said fluid passageway being in fluid communication with an inlet port of a second and third fluid component, respectively.

[c5] A modular fluid manifold for connecting with one or more surface mount type fluid components having an inlet port and an outlet port, the modular system comprising:

one or more bridge fittings having an internal fluid passageway therethrough; said internal passageway of said bridge fitting having an inlet end for connecting to an outlet port of the first fluid component, and an outlet end for connecting to an inlet port of the second fluid component, whereby said internal fluid passageway of said bridge fitting is in fluid communication with said

first and second fluid components when the system is assembled.

- [c6] The modular manifold of claim 5 further comprising: a backing plate for supporting said bridge fittings in a closely spaced manner and mounting said fluid components thereon, wherein said backing plate supports and connects said bridge fittings to said fluid components.
- [c7] The modular manifold of claim 5 wherein said backing plate further comprises a groove for insertion of said bridge fittings therein in a closely spaced manner.
- [c8] The modular manifold of claim 5 further comprising one or more seals for sealing the connection between said ends of the bridge fittings and the ports of the fluid components.
- [c9] The modular manifold of claim 5 further comprising a locator plate mounted between said fluid components and said backing plate; said locator plate further comprising aligned holes for mounting said fluid components thereon; said locator plate having port holes aligned for receiving said inlet and outlet ends of said bridge fittings therein such that said inlet and outlet ports of said components are in fluid communication with said inlet and outlet ends of said bridge fittings.

- [c10] The modular manifold of claim 9 wherein a recess for receiving a gasket is provided between the locator plate upper surface and the inlet and outlet ends of said bridge fittings.
- [c11] The modular manifold of claim 10 wherein said gasket is metal.
- [c12] A modular fluid manifold for connecting with one or more fluid components comprising an inlet port and one or more outlet ports, the manifold system comprising: one or more bridge fittings having an inlet end and an outlet end and an internal passageway joining said ends therethrough;
a locator plate having an upper surface for mounting said fluid components thereon and a plurality of holes aligned with the inlet and outlet ports of said fluid components;
said locator plate having a lower surface for mounting said bridge fittings thereto; said inlet end of each of said bridge fitting being in fluid communication with an outlet port of a fluid component, and an outlet end of each of said bridge fittings being in fluid communication with an inlet port of another fluid component.
- [c13] The modular system of claim 12 wherein a recess for re-

ceiving a gasket is provided between the locator plate upper surface and the inlet and outlet ends of said bridge fittings.

- [c14] The modular system of claim 13 wherein said gasket is metal.
- [c15] The modular system of claim 12 wherein retaining clips are provided to secure said bridge fittings to said locator plate.
- [c16] The modular system of claim 12 wherein said ends of said bridge fittings are press fit into said holes of said locator plate.
- [c17] The modular system of claim 12 wherein one or more of said bridge fittings further comprise a tee fitting located between a first and second elbow fitting; said tee fitting and said elbow fittings having an internal fluid passage-way in fluid communication with each other; said tee fitting having a port opposite of said elbow fitting ports, and aligned to mate with a bridge fitting of another layer.
- [c18] A modular flow system for supplying fluid to gas flow components such as valves, filters, mass flow controllers and the like having an inlet port and an outlet port, the system comprising:

one or more bridge fittings having an inlet port and an outlet port wherein said inlet port of said bridge fitting is connected to the outlet port of said flow component, and the outlet port of said bridge fitting is connected to the inlet port of an adjacent flow component;
one or more channel blocks forming a first substrate layer and having a groove therein for receiving said bridge fittings;
said bridge fittings having an exterior shape such that said bridge fittings do not rotate when placed within said groove.

[c19] The flow system of claim 18 wherein one or more of said channel blocks further comprise a cross channel branch for receiving flow bridges therein for directing fluid from one channel block in one row to another channel block in another row.

[c20] The modular flow system of claim 18 further comprising a second substrate layer having a groove therein for receiving one or more flow bridges, each of said bridges having an inlet port and an outlet port.

[c21] The system of claim 18 wherein said groove of said first substrate layer having aligned holes with said ports of said flow bridges in said second layer,

at least one of said flow bridges in said upper substrate layer having a port which is received in said channel hole and being in aligned sealing engagement with a port of a flow bridge whereby fluid may flow from one substrate layer to another.

- [c22] The system of claim 19 wherein said second substrate level is comprised of one or more channel blocks having a channel formed therein; said blocks being mounted to said first substrate layer.
- [c23] The system of claim 19 wherein said second substrate level is comprised of one or more multiport flow bridges.
- [c24] The modular flow system of claim 18 further comprising a second substrate layer comprised of one or more flow bridges, each of said bridges having an inlet port and an outlet port; said flow bridges being secured to said channel blocks of said first substrate layer by straps having a groove therein for receiving said bridges.
- [c25] A modular flow block for use in a modular flow system comprising:
 - a block having tabular ends for securing said blocks;
 - said tabular ends being staggered for interlocking said tabular ends with tabular ends of an adjacent block.
- [c26] A drop down bridge fitting for use in a modular flow sys-

tem, the fitting comprising:

a fitting having an upper substrate port for connecting to an aligned port of a fluid component, and an elbow shaped fluid passageway connected to an opening of a tee fitting; said tee fitting having an internal fluid passageway ending in an upper substrate port and an opposed lower substrate port wherein fluid flow may be directed from one substrate level to another substrate level.

[c27] A modular flow system comprising: one or more modular blocks having a channel for receiving one or more flow bridges therein; said flow bridges being formed of a material having a coefficient of thermal expansion less than the material of said channel; said flow bridges being received in said channel and having a top surface a specified distance greater than the top surface of said channels in an unheated condition; one or more surface mount components having flanges mounted to the surface of said channel with fasteners; said fasteners being preloaded to a specified tension wherein said system is preloaded so that when said system is heated to a specified temperature said height of said channel top surface becomes about flush with said top surface of said flow bridges.

[c28] A modular flow system comprising:
one or more stampings having a channel formed therein
for receiving one or more flow bridges therein, with a
bottom wall of said channel having a spring-like raised
protrusion formed therein;
said flow bridges being formed of a material having a
coefficient of thermal expansion less than the material of
said channel; said flow bridges being received in said
channel wherein said protrusion is depressed wherein
said system is preloaded so that when said system is
heated to a specified temperature said height of said
channel top surface becomes about flush with said top
surface of said flow bridges.